

Johns-Manville



**BONDED
BUILT-UP
ROOFS**

JOHNS-MANVILLE
JM
PRODUCTS



FOR 78 years, Johns-Manville has been mining and manufacturing products from asbestos, steadily acquiring, through those years, a reputation for quality . . . quality based not only upon exceptional facilities for securing the highest grades of raw material . . . as one would expect from the largest asbestos mine in the world . . . but also the quality which results from years of research and experience in fabricating asbestos in its eleven huge factories throughout the United States.

For sixty of those 78 years, Johns-Manville has combined the facilities of a great mine with the expert knowledge and skill of a large manufacturer in the making of asbestos roofings, controlling every step from mine to market, to the distinct advantage of every present or prospective user of a Johns-Manville Built-up Roof.

In the pages which follow are discussed the inherent qualities which make a roof dependable, long-lived and fire-resistant, and the lasting benefits which will accrue from the use of proper materials, properly applied.

JOHNS-MANVILLE BONDED BUILT-UP ROOFS

Realizing that no one type of built-up roof can be acceptable or usable under all conditions, and recognizing the factor of individual preference, Johns-Manville has developed a number of different types of built-up roofs and is in a position to furnish a roof to meet practically any condition or personal preference.

The various standard J-M Built-up Roofs are tabulated on pages 8 and 9, with ratings of the Underwriters' Laboratories, Inc., and are classified on the basis of the kind of felt and number of layers used in their construction.

Johns-Manville Smooth-Surfaced Asbestos Built-up Roofs

While Johns-Manville furnishes built-up roofs of every type, the smooth-surfaced asbestos roof is recommended as the one best designed to stand up under all conditions and to give complete trouble-free protection for the life of the building.

J-M Smooth-Surfaced Asbestos Built-up Roofs are the outcome of several decades of study and experience in producing durable, fireproof, weatherproof, lightweight roofs at a moderate cost. They are suitable for practically every type of industrial building, warehouse, office building, hotel, hospital and apartment house.

They are built up of alternating layers of asphalt-saturated asbestos felt and roofing asphalt.

J-M Asbestos Felts, with which J-M Bonded Asbestos Roofs are built up, will not support combustion even when impregnated and coated with asphalt. The Underwriters' Laboratories, Inc., give Class A ratings to both J-M Super Class A and Class A Asbestos Roofs. They are fire-resistant to the highest degree.

J-M Bonded Roofing Asphalt—a relatively recent development in asphalt processing which has proved to be far superior to ordinary asphalts—is used on all J-M Bonded Asbestos Roofs. Tests at the Johns-Manville Research Laboratories at Manville, N. J., have demonstrated that the unusual ability of J-M Bonded Asphalt to stand up under all conditions of service will add years to the life of a roof.

Other Types of J-M Bonded Roofs

In addition to asbestos roofs, Johns-Manville also supplies Combination Roofs, composed of a rag base felt and asbestos finishing felts, and a complete line of slag or gravel-surfaced roofs, employing tar-saturated asbestos felts, tar-saturated rag felts, or asphalt-saturated rag felts.

All these types of J-M Bonded Roofs are included in the tables on pages 8 and 9.

Approved Roofing Contractors

As the best results are obtained only when the proper roofing is correctly laid, Johns-Manville has appointed Approved Roofing Contractors throughout the country, basing these appointments on experience, integrity and financial responsibility.

Roof Inspection

Johns-Manville maintains a corps of inspectors whose services are available in connection with bonded built-up roofs. This service is required in connection with every roof which is to be bonded and is rendered before, during, and after application.

Surety Roofing Bonds

All Johns-Manville Built-up Roofs of whatever type will, when desired, be covered by a bond of the National Surety Corp., guaranteeing the performance of the particular roof for a period of from ten to twenty years, depending on the type of roof applied. This bond is issued only on roofs laid by Johns-Manville Approved Roofing Contractors and in connection with Johns-Manville inspection service.

Where Johns-Manville Flashing Materials are used in conjunction with Johns-Manville Roofing, a flashing endorsement for a ten-year period will be attached to and become part of the bond, under the same conditions imposed for the bonding of the roof.

Johns-Manville recommends the smooth-surfaced asbestos roof as the best assurance of complete, trouble-free protection for the life of the building



8 7 Why a SMOOTH-SURFACED ASBESTOS ROOF

**provides the best
assurance of
roof permanence**

Since the primary purpose of a roof is permanent protection from the elements, it is obvious that a good roof must not only shed water, it must *stay* waterproof. And, for permanence, it must also be proof against fire and decay.

Scientific research has found no waterproofing agent better than asphalt, which has been proved to be less brittle at low temperatures and less fluid at high temperatures than any other known waterproofing material. Yet there are many kinds and grades of asphalt. In the effort to secure the permanence requisite in a good roofing asphalt, J-M research engineers have developed a processed asphalt known as J-M Bonded Roofing Asphalt, which has shown marked superiority over all other asphalts ordinarily used for such purpose.

J-M Bonded Roofing Asphalt

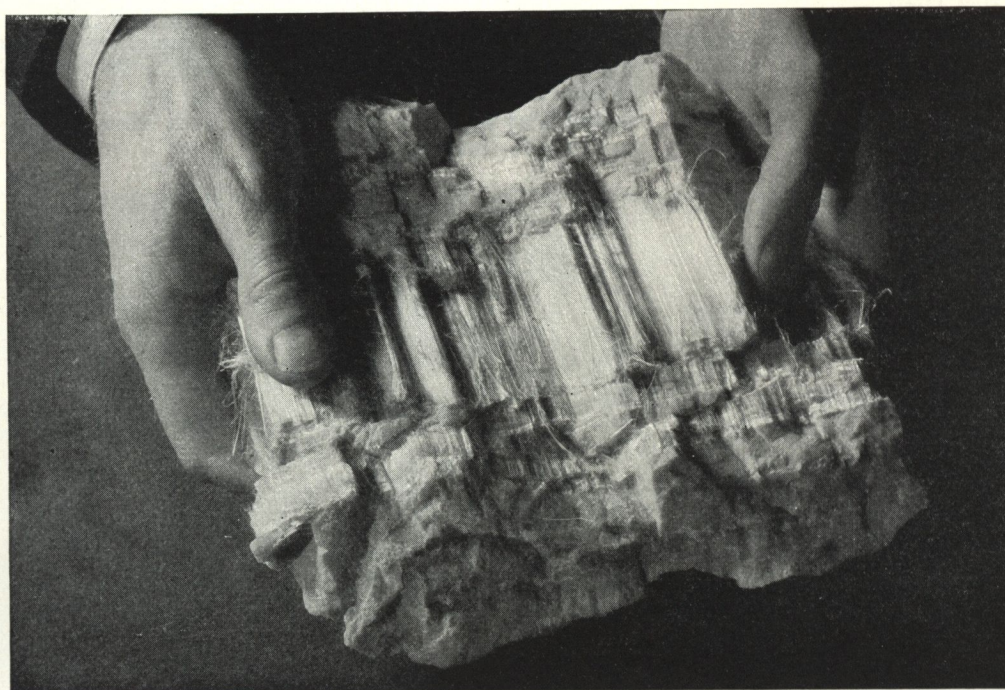
In a series of scientific tests by machine weathering, the J-M Laboratories subjected samples of Bonded Roofing Asphalt and other commercial asphalts to alternating cycles of exposure to heat, rain and sub-zero temperature, equivalent to ten years of actual service. Although the samples



After water spray, arc light and refrigeration, representing rain, heat and cold, were played on these three samples of roofing asphalts, for the equivalent of 10 years of actual weathering, J-M Bonded Roofing Asphalt (right) was still as good as new

had practically similar appearance before testing, the illustration above shows how Bonded Roofing Asphalt stood up when the others failed. It is this unusual permanence which qualifies J-M Bonded Roofing Asphalt as the satisfactory waterproofing agent in J-M Bonded Built-up Roofs.

However, even the best asphalt cannot, alone, make a good roof. There must be a flexible reinforcement, durable and non-combustible, which can itself be impregnated with



Asbestos—fibres of stone—fire-proof, rot-proof, enduring—the base of a good built-up roof. Crude asbestos fibres are here shown still attached to the serpentine rock matrix

asphalt to keep it waterproof, and which at the same time will protect the asphalt from its one cause of deterioration—the drying-out action of the sun. Asbestos felt meets these requirements exactly.

How Asbestos Felt preserves the waterproofing asphalt

The characteristic difference between asbestos fibre and all other natural fibres is that asbestos fibre is a solid filament, not a hollow tube. There can be no capillary action through it. This makes asbestos felt highly difficult to impregnate, since the waterproofing must be forced between and around the fibres, coating them and filling all the interstices, rather than their soaking it up with the blotter-like effect of organic fibres.

But this very lack of capillary action and consequent resistance to impregnation is the source of the great protection which asbestos felt affords the vital waterproofing asphalt, once the felt is impregnated with it. The essential oils of the asphalt are protected from evaporation due to the continuous drying-out action of the sun, which so rapidly deteriorates other types of roofing, and the asbestos built-up roof *stays* waterproof. The accompanying diagram of the security afforded by asbestos felt is self-explanatory.

When the asbestos felt has been impregnated with J-M Bonded Roofing Asphalt, and Bonded Roofing Asphalt used as the cementing layer between the plies of felt forming

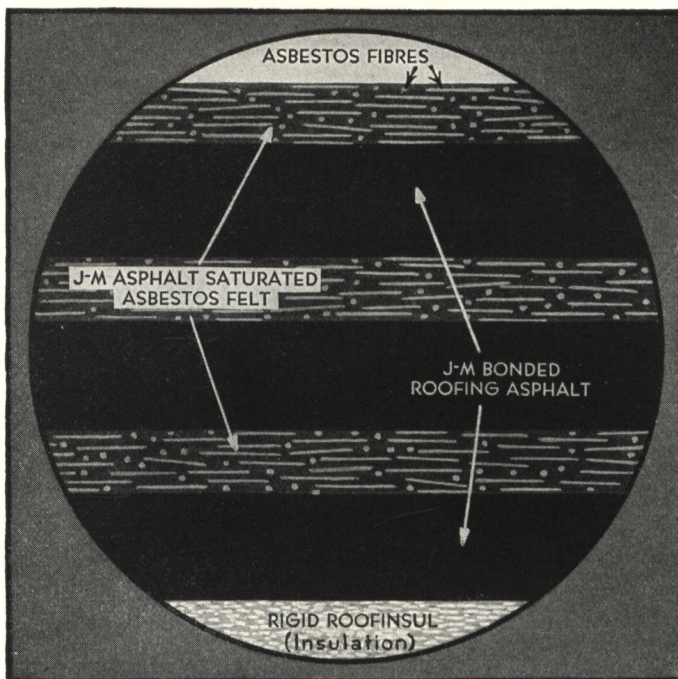
the built-up roof, the asphalt is preserved in practically its original condition. The result is a smooth-surfaced roof that *stays* waterproof for years with minimum upkeep.

Proof against fire or decay

But asbestos does more than merely protect from weather. Asbestos is fire-proof and rot-proof and thus adds the other two essentials to roof permanence. Its very existence—in the oldest igneous rocks—proves its endurance against the destructive forces of fire, time and the elements.

Asbestos felt is virtually felted fibres of stone. It cannot decay; it will not burn. Exhaustive tests by The Underwriters' Laboratories, which included exposure to radiant heat, burning brands and direct flame, have proved that asbestos felt, even when impregnated and coated with asphalt, as used in a J-M Built-up Roof, will not support combustion. J-M Super Class A and Class A Asbestos Roofs are so fire-resistant that they carry the Underwriters' Class A rating, which takes the base rate of insurance.

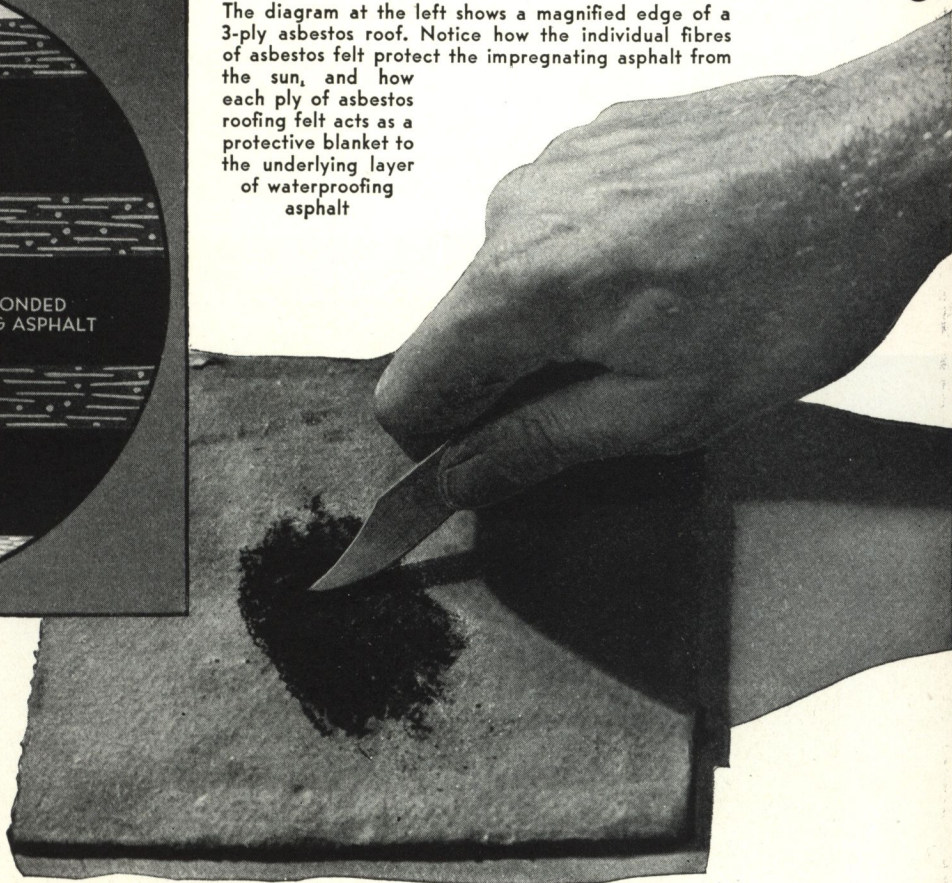
The attitude of insurance authorities toward any building material is of special interest, not alone because it serves as a reliable index to the fire-resistance of the material and consequent favorable insurance rates, but also, by logical inference, it is a recognition of the permanence of the material in question. Thus their highest rating accorded a J-M Smooth-surfaced Asbestos Roof is additional assurance of roof permanence.

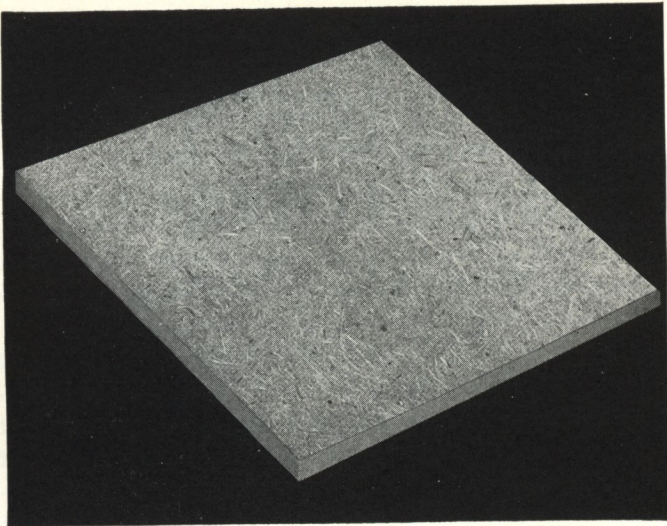


The diagram at the left shows a magnified edge of a 3-ply asbestos roof. Notice how the individual fibres of asbestos felt protect the impregnating asphalt from the sun, and how each ply of asbestos roofing felt acts as a protective blanket to the underlying layer of waterproofing asphalt

Right:

If you scrape the gray surface of an asbestos roof with a pen-knife the black asphalt appears below. You can repeat this test a dozen times in the same spot and will obtain the same results





Efficient, strong J-M Rigid Roofinsul, especially designed for insulating roofs of industrial, commercial and institutional buildings

HEAT LOSSES FOR INSULATED AND UNINSULATED ROOF CONSTRUCTIONS

Type of Roof	Thickness of J-M Rigid Roofinsul	Heat Loss in B. t. u. per sq. ft., per deg. F. temperature difference, per hour
7/8" wood deck and smooth-surfaced built-up roof	None	.533
	1/2"	.296
	1"	.205
	1 1/2"	.157
	2"	.127
1 5/8" wood deck and smooth-surfaced built-up roof	None	.381
	1/2"	.242
	1"	.178
	1 1/2"	.140
	2"	.116
4" concrete and smooth-surfaced built-up roof	None	.676
	1/2"	.336
	1"	.223
	1 1/2"	.167
	2"	.134
5" concrete and smooth-surfaced built-up roof	None	.625
	1/2"	.323
	1"	.217
	1 1/2"	.164
	2"	.132

6 GOOD REASONS FOR AN INSULATED ROOF

J-M Rigid Roofinsul

- Prevents condensation and roof drip
- Protects the deck against rot and corrosion
- Prevents damage to roofing felts through deck movement
- Provides closer interior temperature control
- Improves working conditions
- Saves fuel

Insulation on industrial, commercial and institutional buildings is rapidly gaining acceptance as a decidedly economical investment.

In connection with its Bonded Built-up Roofs, Johns-Manville recommends insulation with J-M Rigid Roofinsul for the following reasons:

First: It prevents condensation on the under side of the deck and eliminates discoloration of ceilings and the annoyance and damage caused by roof drip.

Regardless of how carefully a wood deck may be constructed, vapors penetrate the planking, condense on the underside of the built-up roof and rot starts at the top, unseen, and works down. While the problem of rot can be eliminated by the use of concrete, that of condensation and roof-drip remains.

When air comes in contact with a cooler surface, such as the underside of a roof, its temperature is lowered. If the temperature of the surface is below the dew point of the

6



Moisture condensation and the resultant decay made the removal of these old wood decks imperative. J-M Rigid Roofinsul would have prevented this expense



Applying J-M Rigid Roofinsul in three $\frac{1}{2}$ " layers. Roof insulation not only saves fuel and assures comfortable interior temperatures, but also protects both the roof deck and the built-up roof

water vapor in the air, the excess moisture is deposited on the surface as condensation. Insulation of the proper thickness will keep the temperature of the surface above the dew point and prevent the deposition of moisture.

Second: By preventing condensation, it protects the deck against rot and corrosion. When the deck is of concrete or other non-combustible material, J-M Rigid Roofinsul reduces the danger of cracking (commonly caused by sudden temperature changes) and thereby tends to prevent moisture from reaching the reinforcing steel members.

Third: It provides protection to the roofing felts themselves. All roof decks move to some extent under temperature changes. When this cycle of alternate expansion and contraction continues over a long period of time, any cracks in the deck may eventually be transmitted to the built-up roof unless there is an intervening layer of insulation. J-M Rigid Roofinsul not only minimizes movement of the deck by keeping its temperature more uniform, but also provides sufficient resiliency to take up strains due to any movement which does occur and prevent their transmission to the felts, thus prolonging the life of the roof.

Fourth: It permits closer control over interior temperatures both in summer and winter, assuring more comfortable, uniform working conditions throughout the year. Uniform interior temperatures are also a vital necessity in the operation of many modern industrial processes.

Fifth: It effectively retards the passage of heat through the roofs, thus saving on fuel and air conditioning bills. See table on opposite page.

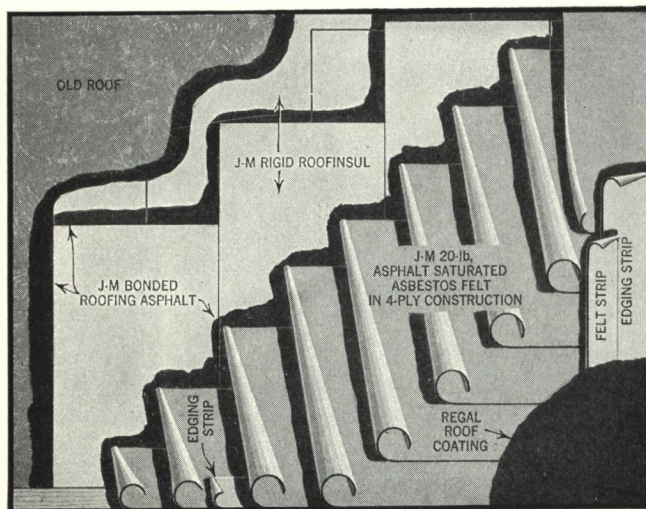
Sixth: On new construction, it makes it possible to reduce appreciably the investment in heating and air conditioning equipment.

J-M RIGID ROOFINSUL

J-M Rigid Roofinsul was designed especially for use as insulation over roof decks, principally under J-M Bonded Asbestos Built-up Roofs. It is light in weight and has a high insulating value, and is also rigid and structurally strong. J-M Rigid Roofinsul has a high resistance to moisture absorption. It lasts for years in the open and, when covered with a J-M Bonded Asbestos Roof, will last as long as the roof itself.

Any desired number of layers of J-M Rigid Roofinsul can be installed to give any needed insulating efficiency, without adding appreciably to the weight of the roof.

J-M Rigid Roofinsul is furnished 24" x 48". The standard thickness is $\frac{1}{2}$ ". If sheets of greater thickness than $\frac{1}{2}$ " are desired, two or more sheets are stapled together with a $\frac{3}{4}$ " ship-lap joint on all four edges. Weight approximately 0.8 lb. per sq. ft., $\frac{1}{2}$ " thick.



J-M 4-ply Asbestos Roof applied on old roof over insulation. Specifications Nos. 104, 105 or 108 (see tables). Bonded for 20 years

CONDENSED SPECIFICATIONS FOR J-M BONDED BUILT-UP ROOFS

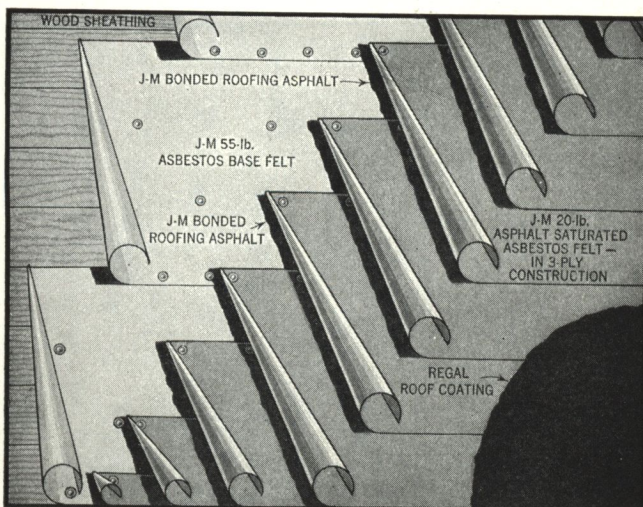
Over Wood Decks

PITCH OF ROOF INCHES PER FOOT	*20-YEAR ROOFS*					*15-YEAR ROOFS*					*10-YEAR ROOFS*				
	SURFACE	UNDERWRITER'S RATING	J-M DESIGNATION	J-M SPECIFICATION No.	MATERIALS (WEIGHTS GIVEN PER 100 SQUARE FEET)	SURFACE	UNDERWRITER'S RATING	J-M DESIGNATION	J-M SPECIFICATION No.	MATERIALS (WEIGHTS GIVEN PER 100 SQUARE FEET)	SURFACE	UNDERWRITER'S RATING	J-M DESIGNATION	J-M SPECIFICATION No.	MATERIALS (WEIGHTS GIVEN PER 100 SQUARE FEET)
1/4 To 9	SMOOTH	A	SUPER CLASS A	100	ONE 55-lb. ASPH.-SAT. ASBESTOS FELT THREE 20-lb. " " " " " " 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH	A	CLASS A	103	ONE 55-lb. ASPH.-SAT. ASBESTOS FELT TWO 20-lb. " " " " " " 60 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH		COMBINATION 30	202	ONE 30-lb. ASPH.-SAT. RAG FELT TWO 20-lb. " " ASBESTOS FELTS 60 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)*
	SMOOTH		COMBINATION 345	205	ONE 50-lb. ASPH.-SAT. RAG FELT THREE 20-lb. " " ASBESTOS FELTS 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH		COMBINATION 45	200	ONE 50-lb. ASPH.-SAT. RAG FELT TWO 20-lb. " " ASBESTOS FELTS 60 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)					
	SMOOTH (OVER INSULATION)	A	4-A-1	104	OVER J-M RIGID ROOFINSUL: FOUR 20-lb. ASPH.-SAT. ASBESTOS FELTS 120 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH (OVER INSULATION)	B	3-A-1	106	OVER J-M RIGID ROOFINSUL: THREE 20-lb. ASPH.-SAT. ASBESTOS FELTS 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)					
4 To 9											CRUSHED SLATE	C	SLATEKOTE	400	TWO 15-lb. ASPH.-SAT. RAG FELTS TWO 50-lb. " " SLATEKOTE FELTS 60 lbs. BONDED ASPHALT (HOT)
2 To 6											SLAG		5-TWS	601	ONE PLY ROSIN-SIZED PAPER FIVE 15-lb. TAR-SAT. ASBESTOS FELTS 60 lbs. BONDED PITCH (IN-BETWEEN MOPPING) 45 lbs. BONDED ASPHALT (TO EMBED SLAG) 250 lbs. SLAG
											SLAG (OVER INSULATION)		4-TIWS	610	OVER J-M RIGID ROOFINSUL: FOUR 15-lb. TAR-SAT. ASBESTOS FELTS 105 lbs. BONDED PITCH (IN-BETWEEN MOPPING) 45 lbs. BONDED ASPHALT (TO EMBED SLAG) 250 lbs. SLAG
1 To 4											CRUSHED SLATE	C	SLATEKOTE	402	THREE 15-lb. ASPH.-SAT. RAG FELTS TWO 50-lb. " " SLATEKOTE FELTS 120 lbs. BONDED ASPHALT (HOT)
2 To 4											SLAG	A*	5-W5	301	FIVE 15-lb. ASPH.-SAT. RAG FELTS 165 lbs. BONDED ASPHALT (HOT) 250 lbs. SLAG
1/4 To 2	GRAVEL OR SLAG	A	5-WF	300	FIVE 15-lb. ASPH.-SAT. RAG FELTS (TWO LAID DRY, THREE HOT-MOPPED) 160 lbs. BONDED ASPHALT (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	GRAVEL OR SLAG	A	4-WF	304	FOUR 15-lb. ASPH.-SAT. RAG FELTS (TWO LAID DRY, TWO HOT-MOPPED) 150 lbs. BONDED ASPHALT (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG					
	GRAVEL OR SLAG		5-TWF	600	ONE PLY ROSIN-SIZED PAPER FIVE 15-lb. TAR-SAT. ASBESTOS FELTS (TWO LAID DRY, THREE HOT-MOPPED) 150 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	GRAVEL OR SLAG	A	4-TWF	604	ONE PLY ROSIN-SIZED PAPER FOUR 15-lb. TAR-SAT. ASBESTOS FELTS (TWO LAID DRY, TWO HOT-MOPPED) 125 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG					
	GRAVEL OR SLAG (OVER INSULATION)		4-TIWF	606	OVER J-M RIGID ROOFINSUL: FOUR 15-lb. TAR-SAT. ASBESTOS FELTS 200 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	GRAVEL OR SLAG (OVER INSULATION)	A	3-TIWF	608	OVER J-M RIGID ROOFINSUL: THREE 15-lb. TAR-SAT. ASBESTOS FELTS 175 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	SMOOTH (FOR SPRAY DECKS)		CLASS A WITH FABRIC	110	FOR USE ON SPRAY DECKS: ONE 55-lb. ASPH.-SAT. ASBESTOS FELT ONE TYPE B " " FABRIC TWO 20-lb. " " ASBESTOS FELTS 115 lbs. BONDED ASPHALT (HOT)
1/4 To 1	SMOOTH (FOR USE UNDER LIGHT FOOT TRAFFIC)	A	SUPER CLASS AF	102	FOR USE UNDER LIGHT FOOT TRAFFIC: ONE 55-lb. ASPH.-SAT. ASBESTOS FELT THREE 20-lb. " " " " " " ONE 85-lb. EXTRA HEAVY FLEXSTONE FELT 120 lbs. BONDED ASPHALT (HOT)										

Over Pre-Cast Gypsum Decks

ROOF PITCH INCHES PER FOOT	GRAVEL OR SLAG	A	5-WF	300	SEE SPEC. No. ABOVE FOR MATERIALS	ROOF PITCH IN. PER FT.	GRAVEL OR SLAG	A	4-WF	304	SEE SPEC. No. ABOVE FOR MATERIALS	ROOF PITCH IN. PER FT.	SLAG	A*	5-W5	301	SEE SPEC. No. ABOVE FOR MATERIALS
1/4 To 2	GRAVEL OR SLAG (OVER INSULATION)		5-TWF	600	SEE SPEC. No. ABOVE FOR MATERIALS	1/4 To 2	GRAVEL OR SLAG (OVER INSULATION)		4-TWF	604	SEE SPEC. No. ABOVE FOR MATERIALS	4 To 9	CRUSHED SLATE	C	SLATEKOTE	400	"
			4-TIWF	606	OVER J-M RIGID ROOFINSUL: SEE SPEC. No. ABOVE FOR MATERIALS				3-TIWF	608	OVER J-M RIGID ROOFINSUL: SEE SPEC. No. ABOVE FOR MATERIALS					402	"
2 To 6	SLAG (OVER INSULATION)					2 To 6	SLAG (OVER INSULATION)					2 To 6	SLAG (OVER INSULATION)		4-TIWS	610	OVER J-M RIGID ROOFINSUL: SEE SPEC. No. ABOVE FOR MATERIALS

* CLASS A UNDERWRITERS RATING ON PITCHES UP TO AND INCLUDING 3 INCHES PER FOOT

J-M Super Class A Asbestos Roof over Wood Deck
Specification No. 100. Bonded for 20 years

SPECIFICATIONS FOR ALL J-M ROOFS

Detailed Specifications

Complete and detailed individual specifications are available for every Johns-Manville Built-up Roof listed in the tables on this and the following page. Ask for individual specifications by number, or, where all specifications are desired, ask for "complete set of Architect's Specifications on J-M Bonded Built-up Roofs."

The following condensed specification, however, may be used in the absence of the standard specification, inserting the required items where indicated to complete.

Condensed Specification

Roofing—Shall be Johns-Manville, (*state Designation and Specification Number, see chart*) Built-up Roofing laid in accordance with the manufacturer's Standard Specification, applied by a J-M Approved Roofing Contractor.

CONDENSED SPECIFICATIONS FOR J-M BONDED BUILT-UP ROOFS Over Non-combustible Decks (Poured Concrete or Poured Gypsum)

8
7

PITCH OF ROOF INCHES PER FOOT	•20-YEAR ROOFS•					•15-YEAR ROOFS•					•10-YEAR ROOFS•				
	SURFACE	UNDERWRITER'S RATING	J-M DESIGNATION	J-M SPECIFICATION No.	MATERIALS (WEIGHTS GIVEN PER 100 SQUARE FEET)	SURFACE	UNDERWRITER'S RATING	J-M DESIGNATION	J-M SPECIFICATION No.	MATERIALS (WEIGHTS GIVEN PER 100 SQUARE FEET)	SURFACE	UNDERWRITER'S RATING	J-M DESIGNATION	J-M SPECIFICATION No.	MATERIALS (WEIGHTS GIVEN PER 100 SQUARE FEET)
1/4 To 9	SMOOTH	A	CLASS A	101	ONE 55-lb. ASPH.-SAT. ASBESTOS FELT TWO 20-lb. " " " " 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH	A	COMBINATION 45	201	ONE 50-lb. ASPH.-SAT. RAG FELT TWO 20-lb. " " ASBESTOS FELTS 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH		COMBINATION 30	203	ONE 50-lb. ASPH.-SAT. RAG FELT TWO 20-lb. " " ASBESTOS FELTS 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)
4 To 9	SMOOTH (OVER INSULATION)	A	4-A-1	105	OVER J-M RIGID ROOFINSUL: FOUR 20-lb. ASPH.-SAT. ASBESTOS FELTS 120 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH (OVER INSULATION)	A	3-A-1	107	OVER J-M RIGID ROOFINSUL: THREE 20-lb. ASPH.-SAT. ASBESTOS FELTS 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	CRUSHED SLATE	C	SLATEKOTE	401	ONE 15-lb. ASPH.-SAT. RAG FELT TWO 50-lb. " " SLATEKOTE FELTS 90 lbs. BONDED ASPHALT (HOT)
2 To 6 OVER POURED GYPSUM 1 TO 6 OVER OTHERS											SLAG (OVER INSULATION)		4-TICS	611	OVER J-M RIGID ROOFINSUL: FOUR 15-lb. ASPH.-SAT. ASBESTOS FELTS 105 lbs. BONDED PITCH (IN-BETWEEN MOPPING) 45 lbs. BONDED ASPHALT (TO EMBED SLAG) 250 lbs. SLAG.
1 OR 2 To 6											SLAG		4-TCS	603	FOUR 15-lb. TAR-SAT. ASBESTOS FELTS 65 lbs. BONDED PITCH (IN-BETWEEN MOPPING) 45 lbs. BONDED ASPHALT (TO EMBED SLAG) 250 lbs. SLAG.
1 To 4											CRUSHED SLATE	C	SLATEKOTE	403	THREE 15-lb. ASPH.-SAT. RAG FELTS TWO 50-lb. " " SLATEKOTE FELTS 150 lbs. BONDED ASPHALT (HOT)
2 To 4											SLAG	A*	4-CS	303	FOUR 15-lb. ASPH.-SAT. RAG FELTS 165 lbs. BONDED ASPHALT (HOT) 250 lbs. SLAG
1/4 To 2	GRAVEL OR SLAG	A	4-CF	302	FOUR 15-lb. ASPH.-SAT. RAG FELTS 190 lbs. BONDED ASPHALT (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	GRAVEL OR SLAG	A	3-CF	305	THREE 15-lb. ASPH.-SAT. RAG FELTS 160 lbs. BONDED ASPHALT (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG					
4 To 2 OVER POURED GYPSUM 4 To 1 OVER OTHERS	GRAVEL OR SLAG		4-TCF	602	FOUR 15-lb. TAR-SAT. ASBESTOS FELTS 200 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	GRAVEL OR SLAG	A	3-TCF	605	THREE 15-lb. TAR-SAT. ASBESTOS FELTS 175 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG					
	GRAVEL OR SLAG (OVER INSULATION)		4-TICF	607	OVER J-M RIGID ROOFINSUL: FOUR 15-lb. TAR-SAT. ASBESTOS FELTS 200 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG	GRAVEL OR SLAG (OVER INSULATION)	A	3-TICF	609	OVER J-M RIGID ROOFINSUL: THREE 15-lb. TAR-SAT. ASBESTOS FELTS 175 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG					
1/4 To 1	SMOOTH (FOR USE UNDER LIGHT FOOT TRAFFIC)	A	CLASS AF	102-A	FOR USE UNDER LIGHT FOOT TRAFFIC: ONE 55-lb. ASPH.-SAT. ASBESTOS FELT TWO 20-lb. " " " " ONE 83-lb. EXTRA HEAVY FLEXSTONE FELT 120 lbs. BONDED ASPHALT (HOT)						SMOOTH (FOR USE UNDER PROMENADE TILE)		5-TCPF	612	FOR USE UNDER PROMENADE TILE: FIVE 15-lb. TAR-SAT. ASBESTOS FELTS (LAID TWO SHINGLED; TWO SHINGLED; AND ONE FINAL PLY) 200 lbs. BONDED PITCH (HOT)
1/4 To 1/2	SMOOTH (FOR USE UNDER PROMENADE TILE)	A	4-A-P	112	FOR USE UNDER PROMENADE TILE: TWO PLYS ROSIN-SIZED PAPER FOUR 20-lb. ASPH.-SAT. ASBESTOS FELTS 160 lbs. BONDED ASPHALT (HOT)						SMOOTH (FOR USE UNDER PROMENADE TILE)		COMBINATION 45	204	FOR USE UNDER PROMENADE TILE: TWO PLYS ROSIN-SIZED PAPER ONE 50-lb. ASPH.-SAT. RAG FELT TWO 20-lb. " " ASBESTOS FELTS 130 lbs. BONDED ASPHALT (HOT)
1/4 OR LESS	GRAVEL OR SLAG		4-TCL	613	FOUR 15-lb. TAR-SAT. ASBESTOS FELTS (LAID TWO SHINGLED AND TWO SHINGLED) 200 lbs. BONDED PITCH (HOT) 400 lbs. GRAVEL OR 300 lbs. SLAG						SMOOTH (FOR USE UNDER GRANOLITHIC FINISH)		SUPER CLASS A	114	FOR USE UNDER GRANOLITHIC FINISH: TWO PLYS ROSIN-SIZED PAPER ONE 55-lb. ASPH.-SAT. ASBESTOS FELT THREE 20-lb. " " " " TWO PLYS ROSIN-SIZED PAPER 165 lbs. BONDED ASPHALT (HOT)

9

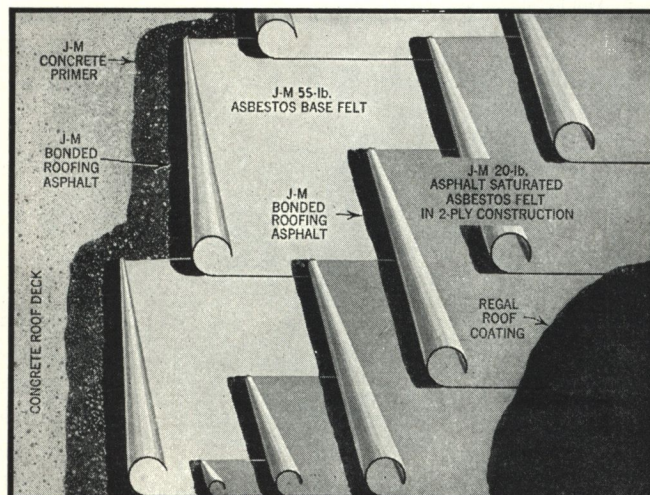
Over Steel Decks

1/2 To 9	SMOOTH	A	4-A-1	108	OVER J-M RIGID ROOFINSUL: FOUR 20-lb. ASPH.-SAT. ASBESTOS FELTS 120 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)	SMOOTH	A	5-A-1	109	OVER J-M RIGID ROOFINSUL: THREE 20-lb. ASPH.-SAT. ASBESTOS FELTS 90 lbs. BONDED ASPHALT (HOT) 8 lbs. REGAL ROOF COATING (COLD)					
* CLASS A UNDERWRITER'S RATING ON PITCHES UP TO AND INCLUDING 3 INCHES PER FOOT															

The roofing contractor shall furnish a J-M (state term) Surety Roofing Bond.

Flashing—Shall be Johns-Manville Flashing applied in accordance with the manufacturer's Standard Specification. It shall be applied on parapet walls (state whether "not less than 8 in. high" or "to extend full height and under coping" or "not less than 8 in. high with cap flashing extended through the wall"). It shall be applied on high walls (state whether "same height as on adjoining parapet walls" or "not less than 8 in. high with cap flashing extended through the wall." If flashing is to be carried into raggle blocks, so state.)

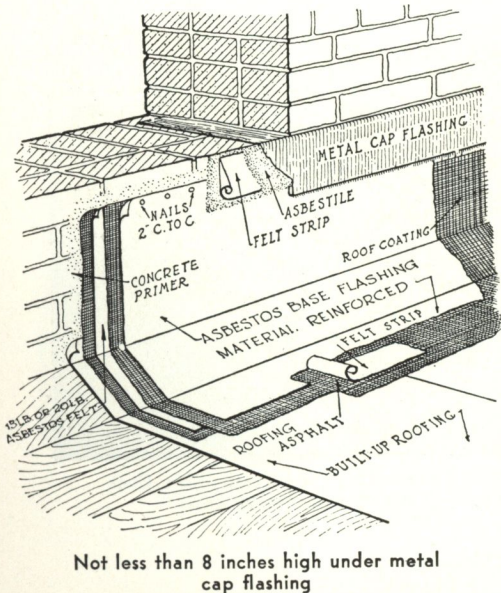
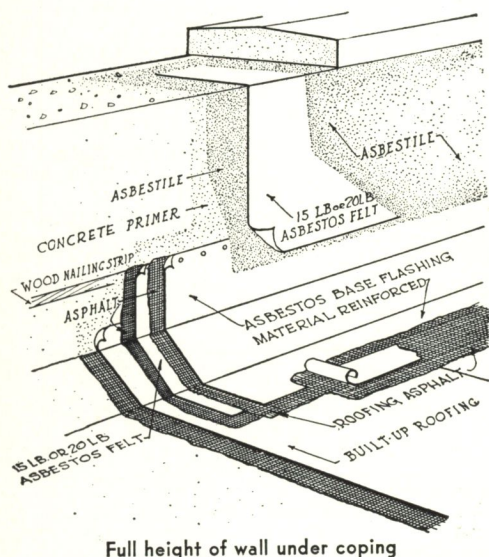
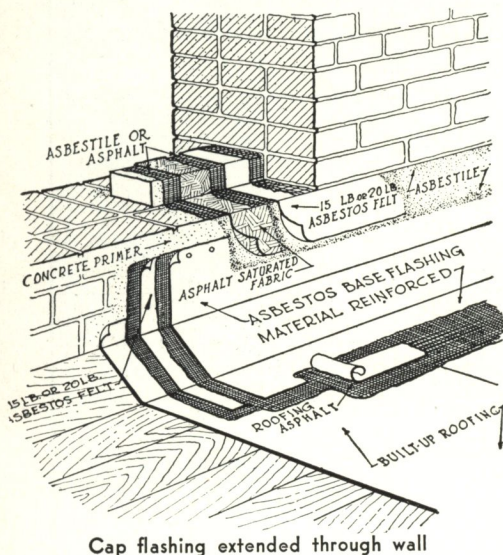
Roof Insulation—Shall be Johns-Manville Rigid Roofinsul (state thickness) thick applied in accordance with the manufacturer's Standard Specification. The insulation shall be underlaid with felt over the entire area.



J-M Class A Asbestos Roof Over Non-combustible Deck
Specification No. 101. Bonded for 20 years

The Johns-Manville Asbestile System of Flashing

J-M BASE AND CAP FLASHING



To protect the most critical areas of the roof, Johns-Manville has developed the Asbestile System of Flashing, a method that has proved effective not only in withstanding weather, but also in maintaining a waterproof joint despite the natural movement of the roof deck.

J-M Asbestile Flashing is bonded in place with J-M Asbestile, a mixture of asbestos fibre, high quality asphalt and a hardening agent. Asbestile will not sag. It is non-corrosive, rotproof and permanent. It becomes a component part of the wall, unaffected by expansion and contraction.

"Through-the-Wall" Flashing provides greater protection than any other known method

In "through-the-wall" flashing (illustrated at the top, left), asbestos flashing felts are applied to the wall in 2-ply construction embedded in Johns-Manville Bonded Roofing Asphalt, each layer nailed to the primed surface of the wall and brought out over the roofing felts.

The edges on the roof are reinforced by an additional felt strip, also embedded in Bonded Asphalt. The upper edges of the base flashing are protected by strips of asphalt-saturated fabric and asbestos felt running through the wall, over a key, and extending down over the base flashing. Each of these strips is embedded in J-M Asbestile and the top felt is coated with Asbestile. This construction forms a complete seal for the built-up roof at its junction with the wall.

Naturally there must be variations in flashing methods to meet varying constructions and different wall materials. In the case of a concrete parapet wall where it is impossible to go through the wall itself, the cap flashing is carried up over the concrete wall and under the coping. This method of flashing is shown in the center sketch at the left.

In cases where metal cap flashing is used, the Johns-Manville base flashing is installed as described above and the metal cap flashing should extend through the wall for adequate protection, as shown in the lower illustration.

The importance of flashing emphasizes the need for competent application

It is obvious that inferior or short-cut methods of flashing will weaken the entire roof from a waterproofing standpoint. This is another reason for the care taken in selecting Johns-Manville Approved Roofing Contractors. They are in position to give sound advice on the best method of flashing for the particular roof construction. They will apply the flashings in accordance with Johns-Manville recommendations, thus insuring a leakproof and fire-proof roof at every point on its entire area.

The Johns-Manville—Holorib Complete Roof Unit

- ROOF DECK
- INSULATION
- BUILT-UP ASBESTOS ROOF

All in One Unit Structure

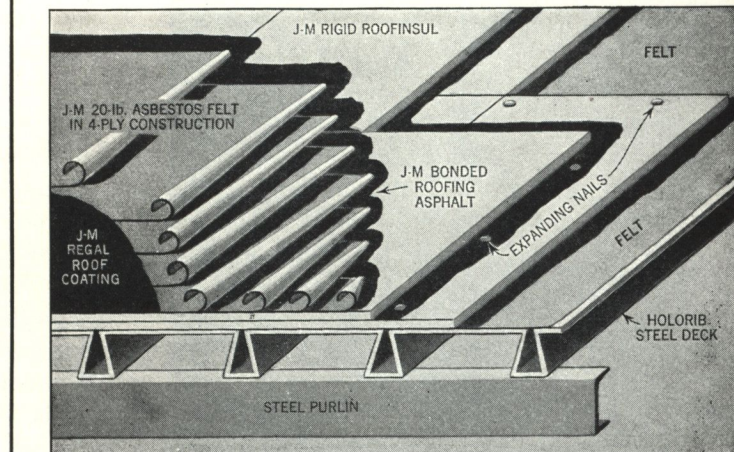
One of the most outstanding developments in roof construction utilizing a steel deck is the Johns-Manville Insulated Roof over a Fenestra Holorib Steel Deck. Roof insulation, weatherproofing, fireproofing and a light-weight, strong, durable deck are combined in *one unit structure*.

Because it is of steel, the Holorib deck is inherently dry. The triangular rib construction not only provides rigidity, but materially reduces the amount of structural steel necessary to secure adequate strength. There is no appreciable expansion or contraction; nor can the deck warp or burn.

Bonded to this steel deck with J-M Roofing Asphalt, and further secured by expanding nails, is J-M Rigid Roofinsul, applied to the desired thickness. And over these insulating sheets is applied a fireproof, permanent Johns-Manville Asbestos Built-up Roof.

A Complete Roof Unit

Here is a roof that provides every quality that goes to make an ideal complete roof structure. The Holorib steel deck combines light weight and unusual strength and durability with an appreciable saving in structural steel requirements. J-M Rigid Roofinsul cuts down the initial cost



Illustrating the manner in which the Johns-Manville-Holorib Complete Roof Unit is constructed. For the sake of clarity, the Holorib deck has been exaggerated in size

of heating equipment, prevents condensation and roof drip, and results in lower fuel bills, more uniform interior temperatures and comfortable working conditions. A J-M Asbestos Built-up Roof assures lasting protection against weather and the danger of roof-communicated fires.

But J-M Bonded Asbestos Roofs are not limited to Fenestra Holorib steel decks. They can be applied over any approved steel deck provided the pitch is at least $\frac{1}{2}$ in. to the foot and that at least one ply of half-inch thick J-M Rigid Roofinsul is first applied to the deck.

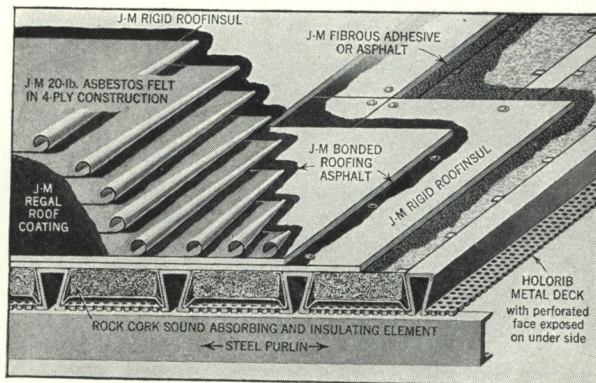
11

In a Johns-Manville SANACOUSTIC-HOLORIB ROOF are combined Ceiling, Acoustical Treatment, Roof Deck, Insulation and Waterproofing

In this type of J-M Roof, the under side of the roof slab forms the ceiling surface of the interior. This consists of sheets of perforated and enameled Holorib metal, securely fastened to the purlins. The enamel surface provides a pleasing, attractive ceiling and helps to reflect diffused light rays. The perforations are unnoticeable except on close examination.

Above these perforated sheets, J-M Rock Cork is installed as the sound-absorbing medium. Sound waves pass through the perforations in the Holorib and are absorbed by the acoustical treatment. By absorbing the major part of sounds produced in the interior, J-M Acoustical Treatment lowers the noise level to a point where it is not detrimental to health, comfort or efficiency.

Over the deck, J-M Rigid Roofinsul and a J-M Bonded Asbestos Built-up Roof are applied.



This diagram shows how the Holorib deck, when inverted and perforated, serves as the ceiling. The Rock Cork provides sound absorption and insulation. Over these materials are then applied J-M Rigid Roofinsul and a J-M Asbestos Built-up Roof

These Johns-Manville 20 years "old" and

The performance of Johns-Manville Smooth-surfaced Asbestos Built-up Roofs is a record of which to be proud. Here are photographs which were taken in 1935 of a few of such roofs . . . every one of which has had a service life of 20 years or longer . . . and all are still in good condition.

Note the pleasing gray appearance of the roofs. As has been explained on page 5, this gray surface is the topmost layer of the asbestos fibres in the asbestos felt which blankets the vital waterproofing asphalt and protects it from the deteriorating action of the sun.

In addition to the roofs illustrated, among the many other Johns-Manville roofs with service records of 20 years or more, are the following typical examples:

35 YEARS "OLD"

At Newark, N. J.

Building No. 4 of General Leather Company. Says Chief Engineer Krill, "During that entire period it has not required any maintenance whatever."

23 YEARS "OLD"

At Seattle, Wash.

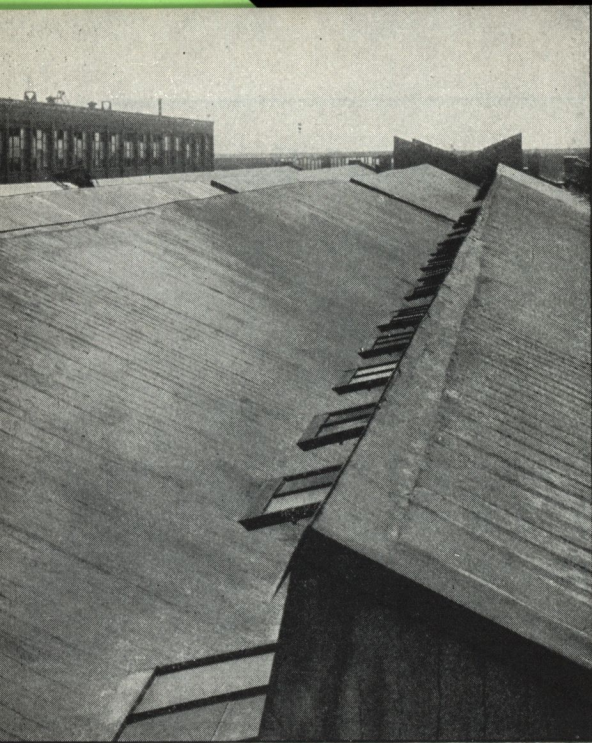
J-M Smooth-surfaced Asbestos Roof was applied for the O.W.R.R. & N. Co., Argo Machine Shop, in September, 1912. Still in splendid condition.

At Detroit, Mich.

Detroit Baseball Company reports, "Your asbestos roofs were installed in 1912 on right and left field pavillions at Navin Park. They have withstood weather and the added punishment of thousands of baseballs striking them. The material appears in good condition."

At Louisville, Ky.

American Medicinal Spirits Company writes, "The performance more than speaks for itself."



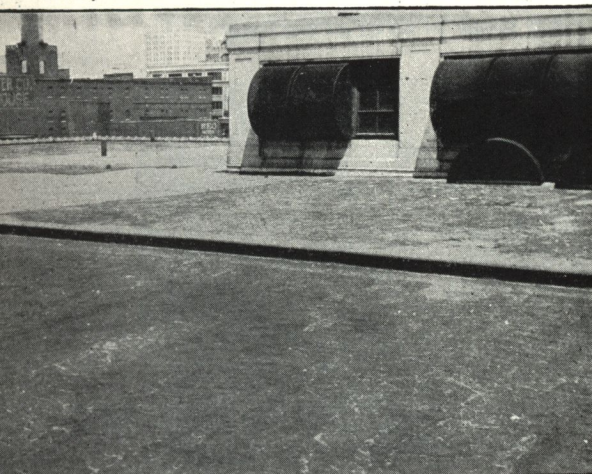
25 Years "Old" at South Bend, Ind.

This J-M smooth-surfaced asbestos roof has been protecting the Oliver Farm Equipment Company factory for a full quarter of a century.



22 Years "Old" at Chicago, Ill.

This J-M asbestos roof was laid in 1913 for Reid, Murdock & Company, 325 No. LaSalle St. The roof has given very satisfactory service.



23 Years "Old" at Kansas City, Mo.

In 1912 this J-M roof was applied on the building of the Kansas City Star. Says the owner, "Certain portions are subjected to foot traffic but it has given excellent service with practically no cost for repairs or maintenance."

20 Years "Old" at Watertown, N. Y.

(At right) Bagley and Sewall Company report that their J-M smooth-surfaced asbestos roofs appear to be in condition to last many years longer.



Built-up Roofs are *still in their prime!*

22 YEARS "OLD"

At Seattle, Wash.

The roof of the Bell Street Dock, Port of Seattle, is still in good condition, although it was applied as long ago as 1913.

At Bluefield, W. Va.

Huff, Andrews and Thomas Company write about their J-M roof, "Except for some shovel cuts caused by the removal of snow last winter, it is in excellent condition . . . Overhead expense has been reduced to a minimum . . . Anticipate many more years of service on this roof."

At Chicago, Ill.

Sears, Roebuck & Co. (Grocery Building) report two 22-year old J-M asbestos roofs "in good condition."

At Los Angeles, Cal.

Agent for Brockman Building reports "repairs to J-M roofs have probably not exceeded \$10 during all this time." Roof applied November 29, 1913.

21 YEARS "OLD"

At Seattle, Wash.

The world war had just started when a J-M roof was applied on the Lincoln High School in Seattle. The asbestos felts are in splendid shape today.

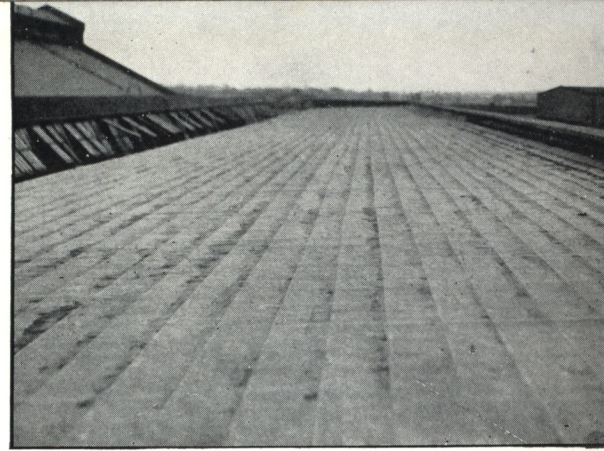
At Los Angeles, Cal.

New Method Laundry states their J-M roof "has given continuous service and is still in excellent condition."

20 YEARS "OLD"

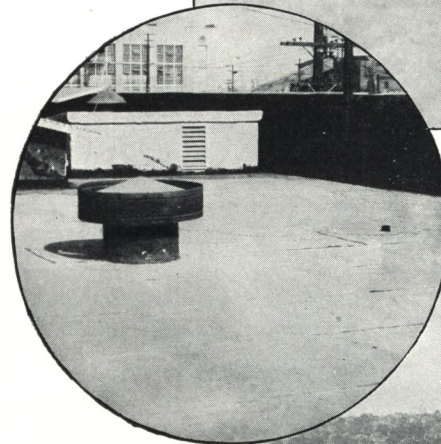
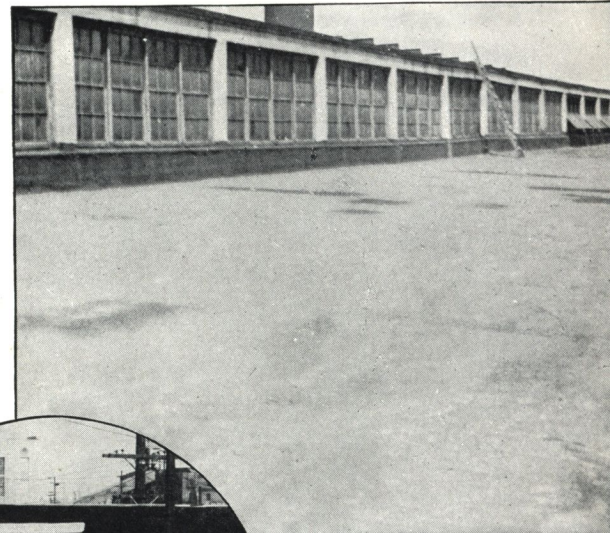
At Los Angeles, Cal.

(In circle) On March 4, 1915, this J-M roof was laid on the warehouse of the Hauser Packing Company. "Good for many more years of service."



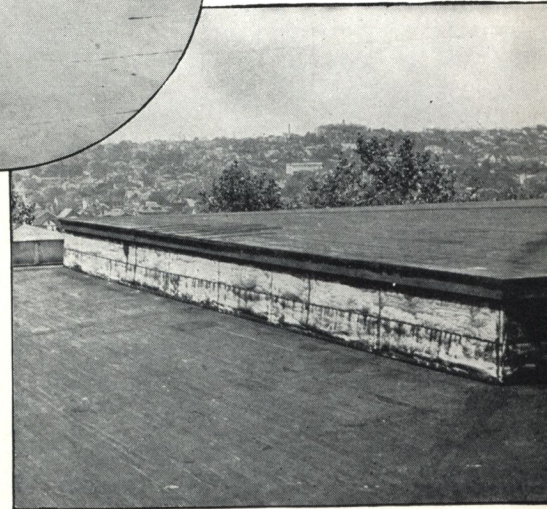
20 Years "Old" at Beach Grove, Ind.

In 1910 the Big Four Railroad bought a J-M smooth-surfaced asbestos roof for their Coach Shop. The photograph shows that it is still in good condition and will undoubtedly give many more years of satisfactory service.



22 Years "Old" at Detroit

In 1913 a J-M asbestos roof was laid for the Enterprise Foundry Company. In 1935 they state, "This roof looks good for many more years."

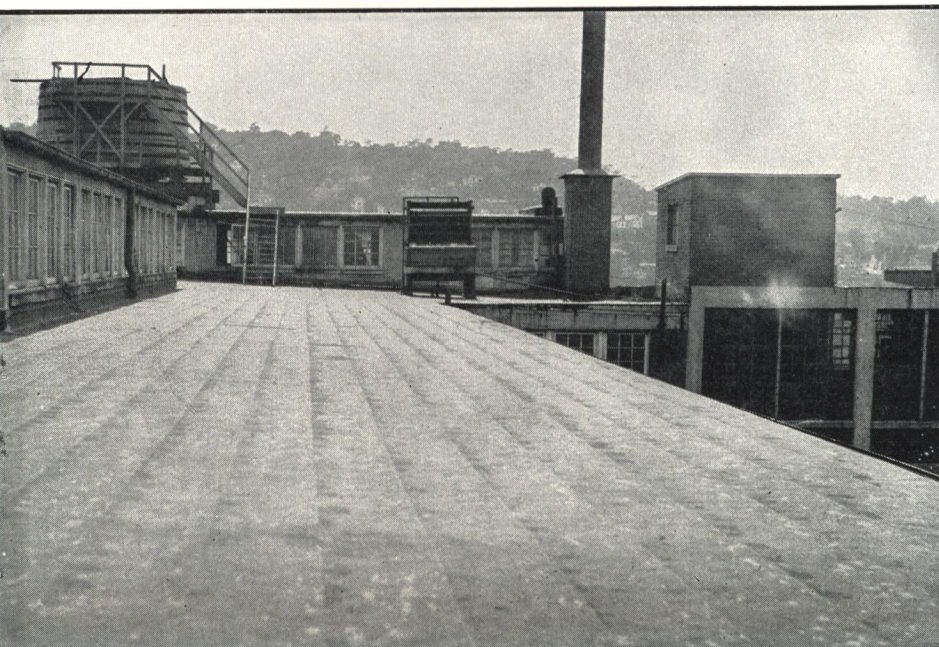


20 Years "Old" at Seattle, Wash.

Meany Hall, University of Washington, is protected by this J-M smooth-surfaced asbestos roof. In good condition after 20 years.

24 Years "Old" at Cincinnati, Ohio

(At left) "Nearly a quarter of a century," says the American Valve and Meter Company of their J-M smooth-surfaced asbestos roof.



OTHER JOHNS-MANVILLE PRODUCTS

Elsewhere in this and in other sections of Sweet's Catalog File—Architectural, will be found details concerning additional Johns-Manville products. Please consult the sections as noted, for the following:

Steeltex Floor Lath for concrete floors and roofs SECTION 3
Welded Wire Reinforcement for concrete construction

Asbestos and Asphalt Roofing and Siding Shingles SECTION 8
Corrugated Transite Industrial Roofing and Siding
Flat Transite Sheets
Transite Ventilators

Acoustical and Sound Control Treatments SECTION 13
Decorative Insulating Board and Hard Board
Insulating Board and Lath
Insulations for heating, plumbing, refrigerating
and air-conditioning systems
Rock Wool Home Insulation

Steeltex for Plaster, Stucco and Brick or Stone Veneer SECTION 14

Asbestos Flexboard and Asbestos Waterproofing SECTION 15
Asphalt Tile Flooring

Transite Walls and Partitions

Complete information, specifications and application details on all other Johns-Manville products will gladly be furnished upon application. Communicate with the address below or with the nearest Johns-Manville office.

JOHNS-MANVILLE
22 East 40th Street
New York, N. Y.



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Asphalt Tile Flooring	
Transite Walls and Partitions	SECTION 20

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